Chemical And Radiation Protection

Lab Safety Spectrum

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UW - Madison Safety Department Chemical and Radiation Protection
30 N. Murray St. 262-8769 http://www.fpm.wisc.edu/safety

Radioactive Materials License No. **25-1323-01** Help Line 265-5518

Radioactive Waste Change

Effective Monday, 28 June, the Safety Department will collect radioactive waste in your lab as part of the chemical waste pickup program. Now you can have all your chemical surplus material and radioactive waste collected by Safety in your labs. It still needs to be properly packaged and documented. Here are some key points and changes:

1. Box solid waste and place the completed Radioactive - LSA label on the box as you have always done.
2. Do NOT box liquid containers. Simply complete a Radioactive - LSA (Liquid) tag and affix to the bottle. Do not use glass containers which can break while in transit. We can supply you with plastic 1 L, 2 L and 1 gallon containers.
3. Complete the orange-colored Radioactive Waste Disposal form, as always. Keep a copy for yourself.
4. Waste will be picked up on Tuesday, sometime between 9 AM and 4 PM. The pick-up procedure divides the campus into 2 groups, AM and PM. Attached is the On-Site Hazardous Materials Management (OSHMM) Building Schedule. Exceptions are WISPIC and Chemistry.
   Request a pickup of radioactive or chemicals by completing the form on our web site: http://www.fpm.wisc.edu/safety/Radiation/pkup.html for radioactive waste and http://www.fpm.wisc.edu/chemsafety/oshmm.htm for chemicals (different information is required for each group).
5. You can also request delivery of empty containers (small containers or carboys) as well as forms, labels, etc.
6. Cabinets now being used for radioactive waste will be removed on Friday, 25 June (e.g., locks changed and cabinet removed). Some rooms on loading docks will continue to be used for animal carcass collection.
7. There is no change in the collection of animal carcasses.

Our goal is to have you promptly dispose of your wastes and have Safety remove your surplus chemicals. In a very few instances, the waste collection may extend into Wednesday, AM, however we believe this will be exceedingly rare. Please review the insert to this newsletter for more packaging / labeling / scheduling information.

For Radioactive Material Labs

As you know, the State now regulates Radioactive Material use within the State of Wisconsin. They will soon be inspecting the University. These persons have never inspected a large license and we can not predict what they will be concentrating on. Therefore, if you use radioactive material insure you:

1. Do surveys every 30 days and post the results
2. Keep up-to-date inventories of radioactive material receipt, use, and disposal
3. Keep records for at least 3 years

Particularly Hazardous Substances Protocol Review

I recently reviewed a chemical protocol in which the researcher was using a potentially volatile chemical in a fume hood. The protocol stated that he would use a cartridge respirator as well. I suggested he contact our Occupational Health Office and have the respirator fit-tested. His reply, "I'm using a fume hood, the mask is only for added protection."

A lot of people have the misconception that more safety equipment is better. That may be incorrect depending on the situation. For that reason, OSHA requires a protocol review for substances which are particularly hazardous (see Appendix D, Chemical Safety and Disposal Guide for discussion of Particularly Hazardous Substances). We have developed a useful review form and placed it on our web site http://www.fpm.wisc.edu/chemsafety/parthazs.pdf Some reasons for a review:

1. Remember, the chemical reaction may not run as you think it will. Perhaps you are using less / more than the procedure you are following. Perhaps the catalyst being used will respond differently at the proposed temperatures / pressures. We have a Chemist who is knowledgeable about reactions and reaction rates who can review your procedure and provide information to help you better understand the hazards of your project.
2. Determine what protective equipment is necessary. Remember, not all protective gloves provide the same measure of protection. Choose a glove based upon the chemicals you are using. Sometimes the best glove for one step of a procedure may not be suitable for use during another step. Many vendors provide glove chemical resistance charts (cf., http://www.fpm.wisc.edu/chemsafety/gloves.htm). Some procedures (e.g., formaldehyde) require use of impermeable aprons and gloves.
3. Respirator use can be required or voluntary. When respirator use is required, the first step is to become medically cleared to wear the respirator. This medical clearance is obtained by completing a special respirator fitness questionaire, that is reviewed by a physician. For most people, the physician approves medical clearance to wear a respirator based upon the information provided.

A few people may need to have a brief physical exam before medical clearance is provided. Contact the Occupational Health Program at 263-2177 to obtain the questionnaire forms and instructions. Fit testing and training are required initially and annually, but only after medical clearance is obtained . Your face is not like anyone else's. You cannot just put on a mask in a hazardous environment and expect it to work. Bill Deppen, an Industrial Hygeniest in the Safety Department (262-9179) assists with fit testing, training, and selection of the proper type of respirator for the materials you are working with.

There is additional information available from the General Safety website (http://www.fpm.wisc.edu/safety/gsp/) regarding voluntary use of respirators. Even with voluntary use there are OSHA regulations that must be followed. Click on the "Respiratory Protection" link in the left column and review "Filtering Facepiece issues." to learn the latest information regarding voluntary use of respirators.

4. Other workers in the lab should be made aware of the use of these materials. Not only discuss the protocol in your lab meetings, but post the area with an appropriate warning sign. Our web site has sample signs (http://www.fpm.wisc.edu/chemsafety/forms.htm).
5. Clean up when completed. Often these procedures are 1-time use. You shouldn't leave particularly hazardous substances laying around the work area.
6. Prepare for an accident. Even the best prepared procedure may not work according to plan. Have all supplies nearby so you can respond to an accident in the event it occurs. Do other lab members know what to do should you be overexposed? What if there is a fire?

Each of these issues is thoroughly reviewed when you protocol review form is completed. The additional advantage of conducting such a review is that your lab has now documented the procedure. The review form should then be incorporated into your lab's Chemical Hygiene Plan so any future use of that protocol will not require the same level of intensive planning, but can be a review of the protocol and any comments made by the last person to conduct the procedure.

One more reason for removing old, out-of-current-use chemicals from your laboratory
I will start with a story … Once upon a time (1998) in a land far, far away (UCLA) lived a happy and industrious folk (researchers). While using a bottle of chloroform, they noticed that people were becoming quite ill. This made them unhappy, so they called in a Safety specialist who determined that there were concentrations of 15,000 ppm of phosgene in the head space of the bottle of chloroform and a 1.1% concentration of phosgene in the bulk solution. [Exposure to 20 ppm for 1-2 minutes can cause severe lung injury and 570 ppm for 1 minute can cause death] The chloroform had been stored properly and was stabilized with amylene. The bottle of chloroform was 3 years old.

And another story … A fellow who was a heavy smoker also happened to work as a dry cleaner. When he had worked for about 3 months, he left work at the end of the day and about 90 minutes later he collapsed and died. An autopsy showed pulmonary edema. Phosgene was believed to have been generated by the decomposition of trichloroethylene (used in dry cleaning) in contact with the hot tip of a burning cigarette.

Phosgene was synthesized by the chemist John Davy in 1812. It was first used as a weapon in 1915 when the Germans added small quantities of it to chlorine to increase the latter's "efficiency". Soon after, use of pure phosgene was begun. Phosgene was responsible for most of the approximately 100,000 gas-caused deaths during WWI.

Phosgene is now widely used as a chemical intermediate. The major use is in the production of aromatic diisocyanates such as methylene diphenyl diisocyanate (MDI) and toluene diisocyanate (TDI), which are used to produce polyurethane foams and other polymers. Other major uses of phosgene include the production of polycarbonate, aliphatic diisocyantes, monoisocyanates and chloroformate esters and urethanes. Phosgene is also used in the manufacture of some agrochemicals, in the pharmaceutical industry and metallurgy.
It has been suggested that the primary source of atmospheric levels of phosgene is from the thermal degradation and photo-degradation of chlorinated solvents such as tri- and tetra-chloroethylene and PVC. Firefighters and workers engaged in welding and building trades are at risk from the phosgene formed by the thermal degradation of chlorinated hydrocarbons and PVC.

Lesson Learned: Mixtures containing chlorinated hydrocarbons, especially carbon tetrachloride, toluene, chloroform and methylene chloride will quickly decompose to phosgene in the presence of fire or heat, or slowly at room temperature. These chemicals, or mixtures containing them, should be treated as time-sensitive. If you have any mixtures or original containers that have been in use for longer than six months, consider sending them to Safety. Remember, if you are using chloroform in a chemical fume hood (as is appropriate), you will not detect the presence of phosgene or hydrogen chloride when performing extractions, and these contaminants are not only a health hazard, but will affect the material you are extracting.

Training:
Chemical and radiation safety training is available weekly. There are two types of schedules; Chem AM classes have the chemical safety class beginning at 9:30 AM and the radiation safety class beginning at 12:30 PM. Rad AM classes have radiation safety classes beginning at 8:30 AM and the chemical safety class beginning at 1 PM. The schedule of these classes through September is:

Chemical AM Chemical Safety Radiation Safety	**Start Time** 9:30 AM 12:30 PM	June 9, 15, 21, 29; July 13, 21, 29; August 12, 18, 24; September 9, 15, 22; October 6, 15, 21; November 12, 18, 24; December 9, 13
Radiation AM Radiation Safety Chemical Safety	**Start Time** 8:30 AM 1 PM	June 3; July 5; August 6, 30; September 27; October 27; December 3

All training classes are held in Union South. No sign-up is needed; a quiz documents training. Booklets for either class can be picked up at our Annex, Room 62, Biochemistry (11 AM - 2 PM). A complete listing of classes is found at http://www.fpm.wisc.edu/safety

Transportation: If you send out or sign for hazardous material (i.e., red-bordered shipping paper), you must have received a formal training class within the past 3 years. Radiation, Biological and Chemical Safety each offer classes to satisfy this requirement. The Chemical Classes are held at Union South on the following dates / times: June 24 (11 AM - 3 PM); July 16 (9 AM - 1 PM); August 9 (11 AM - 3 PM); September 16 (9 AM - 1 PM); October 13 (11 AM - 3 PM); November 2 (9 AM - 1 PM) and December 10 (9 AM - 1 PM). Call Biological Safety (3-2037), Chemical Safety (5-9080) or Radiation Safety (2-1524) to schedule yourself for a class.

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